WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005NJ86B

Title: Microbial degradation of MTBE in anaerobic environments

Project Type: Research

Focus Categories: Water Quality, Toxic Substances, Treatment

Keywords: MTBE, microbial degradation, anaerobic, Methyl tertiary butyl ether, carcinogen, bioremediation

Start Date: 03/01/2005

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Federal Funds: $5,022

Non-Federal Matching Funds: $10,438

Congressional District: 6

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Abstract

Methyl tertiary butyl ether (MTBE) is a gasoline oxygenate added to reduce carbon monoxide emissions and formation of ozone, and has been detected in groundwater as well as surface water across the United States.

MTBE has proven to be recalcitrant in the environment and is now routinely detected in private wells sampled in the NJ area, and also frequently detected in NJ surface water. US EPA currently lists MTBE as a possible human carcinogen

Anaerobic MTBE-degrading microcosms have been established. This proposal seeks to use molecular approaches to characterize the microbial community structure of enriched cultures in order to understand the role of individual anaerobic microbes in MTBE-degradation. MTBE degradation, formation of end products and utilization of electron acceptors will be monitored following previously established procedures. This data will enable the determination of the structure and function of the microbial community in anaerobic MTBE-degrading cultures as well as guide attempts to enhance MTBE

degradation rate. The information uncovered by the project can be used as a basis to assess the natural attenuation potential and to create guidelines for proper management of MTBE-contaminated environments.

The proposed plan will directly respond to a NJWRRI research priority by investigating a microcosm with potential bioremediation use in highly contaminated anaerobic waterways. The research also relates to another research priority, as the continuation of the carbon isotope fractionation experiments and continued study of the isotopic enrichment factor may lead to an effective and reliable tool to assess natural attenuation and properly manage MTBE-contaminated environments, especially New Jersey estuarine and coastal marine environments, as well as subsurface aquifers.